

Applicant: Antti Heikkinen et al.
App. No.: 10/694,291

Claim Listing

1. (original) A multi-roll calender and a fibrous web traversing said multi-roll calender, which multi-roll calender is an on- or off-line multi-roll calender comprising separate first and second sets of rolls, each set of rolls comprising rigid-shell press rolls and resilient-shell backing rolls for the press rolls, placed alternately one after the other, successive nips being situated against each other, as well as a reversing or guide member guiding the run of the fibrous web, wherein in the on- or off-line multi-roll calender comprising two sets of rolls the fibrous web extends past an intermediate moistening means after a first set of rolls, and that in the calender:

a pre-moistening means immediately precedes the first set of rolls, and wherein the fibrous web enters the first set of rolls having a moisture content which is higher than the fibrous web moisture content immediately before the pre-moistening means;

the fibrous web has a moisture content which is lower immediately after the first set of rolls;

after the first set of rolls and the intermediate moistening means, the fibrous web has a moisture content which is higher than the moisture content of the fibrous web immediately before the intermediate moistening means; and

the fibrous web after the second set of rolls has a moisture level lower than the moisture level of the fibrous web before the second set of rolls.

2. (original) The multi-roll calender of claim 1, wherein the fibrous web after the pre-moistening means has a moisture level of 3–10 %, and the fibrous web after the first set of rolls has a moisture level of 1–6 %, and after the intermediate moistening means the fibrous web has a moisture level of 6–14 %, and after the second set of rolls the fibrous web has a moisture level of 4.5–7.5 %.

Applicant: Antti Heikkinen et al.
App. No.: 10/694,291

3. (original) The multi-roll calender of claim 2 further comprising a means for overdrying the fibrous web before the pre-moistening unit preceding the first set of rolls, such that the moisture content of the fibrous web is lower than the equilibrium moisture content dependent on the ambient conditions.

4. (original) The multi-roll calender of claim 1 wherein the web has a first side and a second side, and wherein after the intermediate moistening means the fibrous web is of higher moisture on the first side.

5. (original) The multi-roll calender of claim 4 wherein after the intermediate moistening means the fibrous web is of higher moisture on the second side.

Applicant: Antti Heikkinen et al.
App. No.: 10/694,291

6. (Currently amended) A calender apparatus for control of the moisture gradient of a paper or board web, comprising:

means for pre-moistening the web for raising the moisture content of the web passing from a drying process;

a first set of rolls of a first multi-roll calender immediately following the means for pre-moistening the web, the first set of rolls comprising a plurality of rigid-shell press rolls and resilient-shell backing rolls for the press rolls, placed alternately one after the other, successive nips being situated against each other, as well as a reversing or guide member guiding the run of the fibrous web, the first set of rolls acting to dry the web passing therethrough;

an intermediate moistening unit positioned to receive the web from the first set of rolls, and to raise the moisture content of the web; and

a second set of rolls of a second multi-roll calender comprising a plurality of rigid-shell press rolls and resilient-shell backing rolls for the press rolls, placed alternately one after the other, successive nips being situated against each other, as well as a reversing or guide member guiding the run of the fibrous web, the second set of rolls acting to dry the web passing therethrough to a desired final moisture level.

7. (new) The multi-roll calender of claim 6 wherein the rolls of first set of rolls of the first multi-roll calender has means for the relieving roll loads and the rolls of second set of rolls of the second multi-roll calender has means for the relieving roll loads.

8. (new) The multi-roll calender of claim 1 wherein the rolls of first set of rolls has means for the relieving roll loads and the rolls of second set of rolls has means for the relieving roll loads.